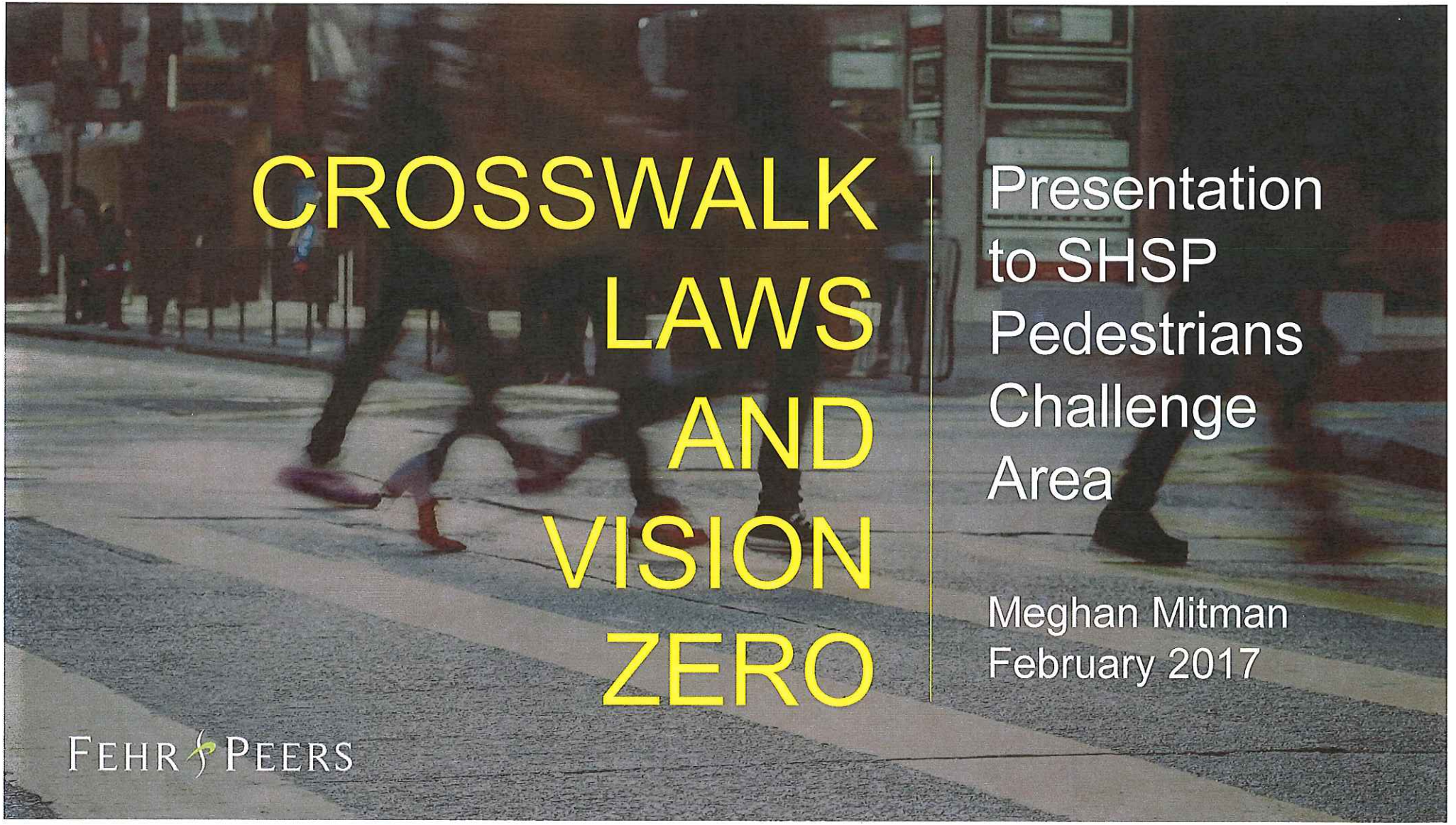

CROSSWALK LAWS AND VISION ZERO

Presentation to SHSP Pedestrians Challenge Area

Meghan Mitman
February 2017

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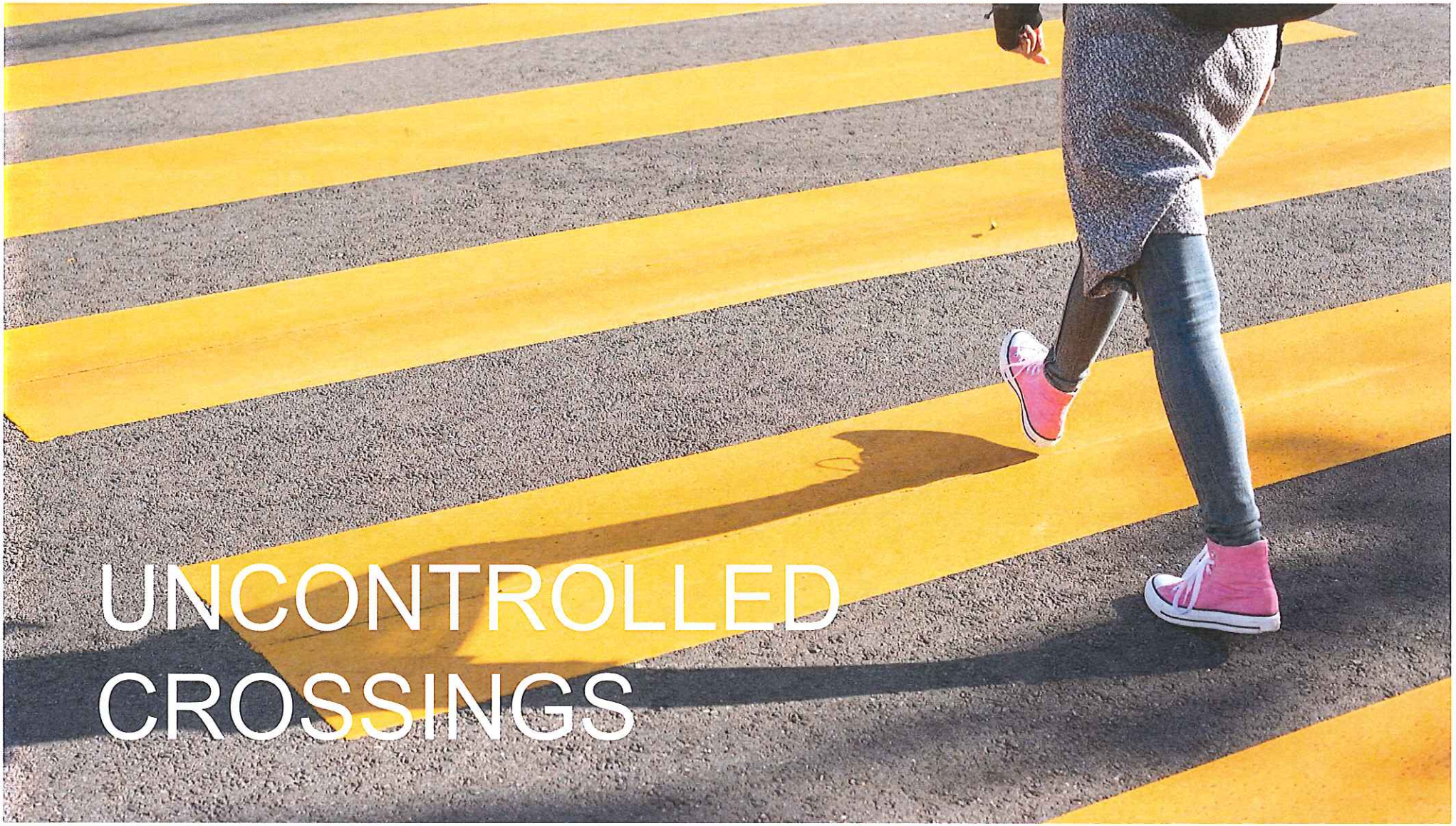

UNCONTROLLED
CROSSINGS

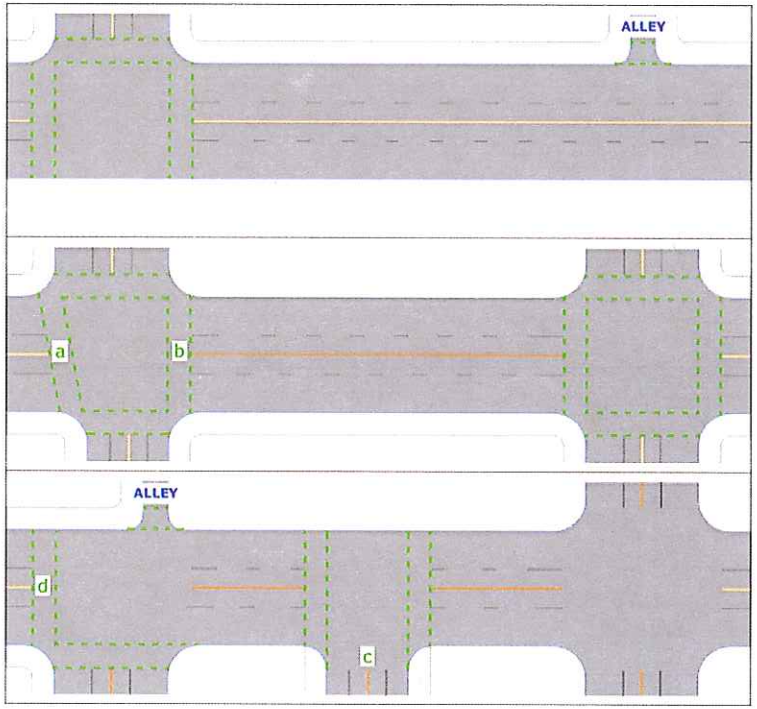
UNCONTROLLED CROSSINGS DECISION MAKING & DESIGN

What is an Unmarked Crosswalk?

California Vehicle Code §275
"Crosswalk" is either:

a) That portion of a roadway included within the prolongation or connection of the boundary lines of sidewalks at intersections where the intersecting roadways meet at approximately right angles, except the prolongation of such lines from an alley across a street.

b) Any portion of a roadway distinctly indicated for pedestrian crossing by lines or other markings on the surface.



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CALIFORNIA LAWS GOVERNING PEDESTRIAN SAFETY

Legislative intent:

21949. (a) The Legislature hereby finds and declares that it is the policy of the State of California that safe and convenient pedestrian travel and access, whether by foot, wheelchair, walker, or stroller, be provided to the residents of the state.

(b) In accordance with the policy declared under subdivision (a), it is the intent of the Legislature that all levels of government in the state, particularly the Department of Transportation, work to provide convenient and safe passage for pedestrians on and across all streets and highways, increase levels of walking and pedestrian travel, and reduce pedestrian fatalities and injuries.

CALIFORNIA LAWS GOVERNING PEDESTRIAN CROSSINGS

Drivers must yield to pedestrians:

21950. (a) The driver of a vehicle shall yield the right-of-way to a pedestrian crossing the roadway within any marked crosswalk or within any unmarked crosswalk at an intersection, except as otherwise provided in this chapter.

But…

(b) This section does not relieve a pedestrian from the duty of using due care for his or her safety. No pedestrian may suddenly leave a curb or other place of safety and walk or run into the path of a vehicle that is so close as to constitute an immediate hazard.

CALIFORNIA LAWS GOVERNING PEDESTRIAN CROSSINGS

Pedestrians may cross midblock – must yield to traffic:

21954. (a) Every pedestrian upon a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield the right-of-way to all vehicles upon the roadway so near as to constitute an immediate hazard.

But…

(b) The provisions of this section shall not relieve the driver of a vehicle from the duty to exercise due care for the safety of any pedestrian upon a roadway.

Pedestrians may not cross midblock :

21955. Between adjacent intersections controlled by traffic control signal devices or by police officers, pedestrians shall not cross the roadway at any place except in a crosswalk.

MARKED CROSSWALK PURPOSE

- Provide guidance for pedestrians
- Help alert drivers to pedestrian crossing
- Establish legal mid-block crossing

Decorative crosswalk

Hopscotch crosswalk in Baltimore

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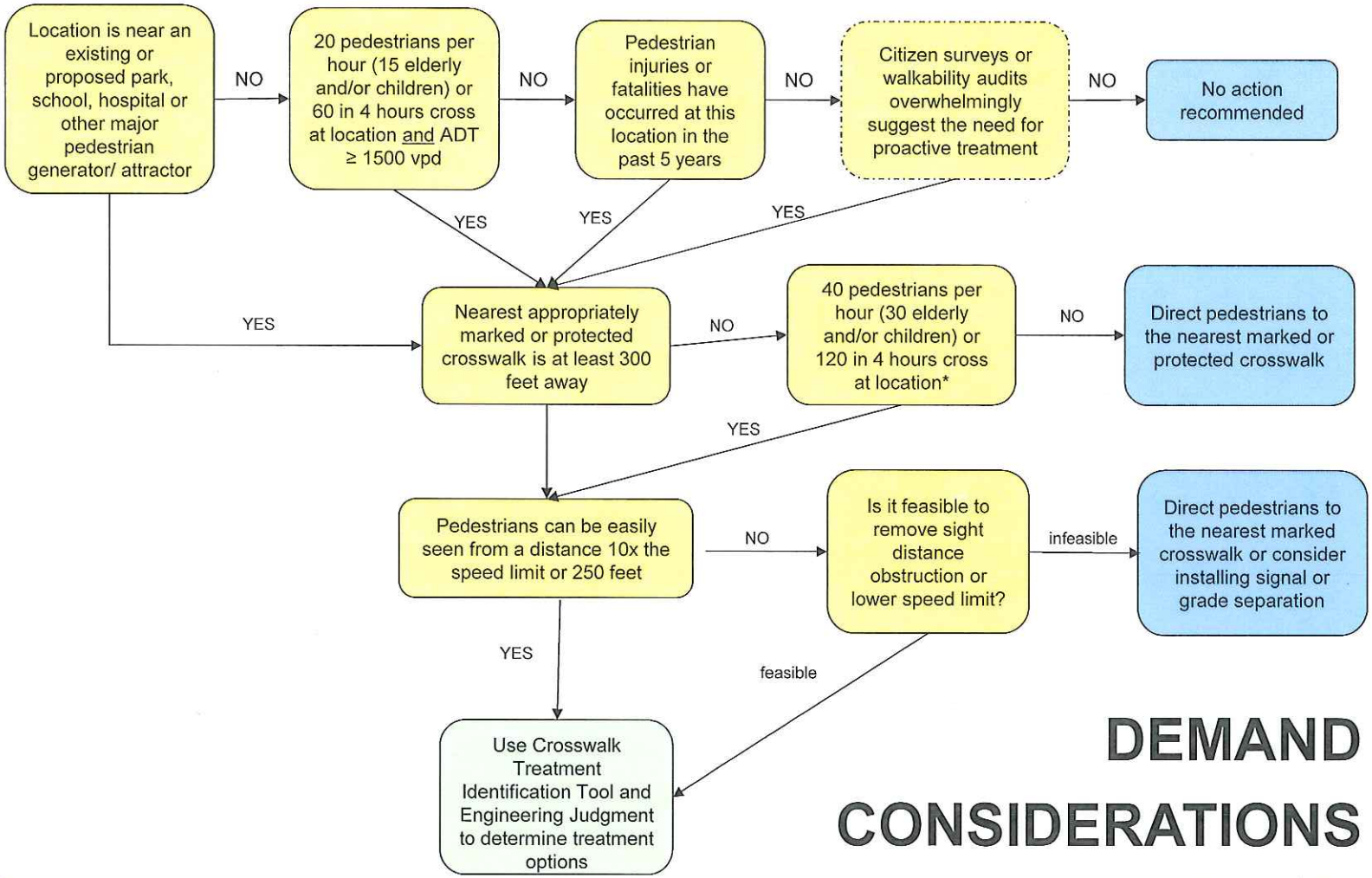

DEMAND CONSIDERATIONS

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UNCONTROLLED CROSSINGS DECISION MAKING & DESIGN

To Mark or Not to Mark?

Herms, Bruce. (1972) Pedestrian crosswalk study: accidents in painted and unpainted crosswalks. Transportation Research Record, 406.

- "The San Diego study"
- Marked crosswalks vs. unmarked crosswalks
- Increased incidence of pedestrian collisions in marked crosswalks
- Did not differentiate between:
  - Number of lanes
  - Traffic volume
  - Speed limit

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UNCONTROLLED CROSSINGS DECISION MAKING & DESIGN

To Mark or Not to Mark?

Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled Locations (2002)

- "The Zegeer study"
- Marked vs. unmarked
- Two-lane roads - no difference in pedestrian crash rate
- Multilane roads - marked crosswalk, without other measures, associated with higher crash rate on roadways with higher ADT and speed

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MULTIPLE THREAT CRASH

UNCONTROLLED CROSSINGS DECISION MAKING & DESIGN

Zegeer Study Key Findings

Table 1. Recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations.*

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT ≤ 9,000			Vehicle ADT >9000 to 12,000			Vehicle ADT >12,000 - 15,000			Vehicle ADT > 15,000		
	Speed Limit**											
	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h	≤ 30 mi/h	35 mi/h	40 mi/h
2 Lanes	C	C	P	C	C	P	C	C	N	C	P	N
3 Lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multi-Lane (4 or More Lanes) With Raised Median***	C	C	P	C	P	N	P	P	N	N	N	N
Multi-Lane (4 or More Lanes) Without Raised Median	C	P	N	P	P	N	N	N	N	N	N	N

Key:

C = Candidate sites for marked crosswalks;

P = Possible increase in pedestrian crashes may occur if crosswalks are marked without other pedestrian enhancements;

N = Marked crosswalks alone are insufficient.

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> Regardless of whether marked crosswalks are used, there remains the fundamental obligation to get pedestrians safely across the street.

FHWA Safety Effects of Marked v. Unmarked Crosswalks

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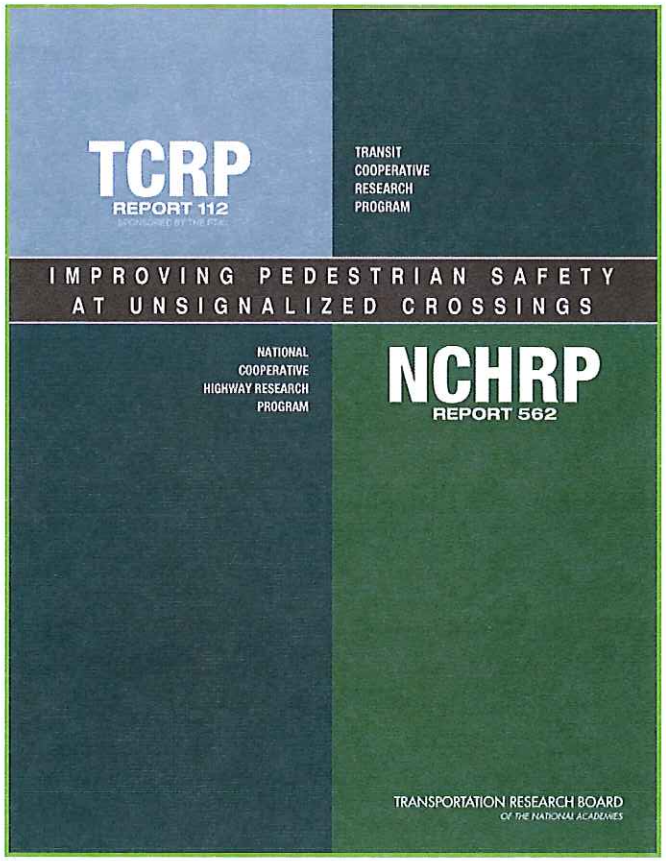
CROSSWALK SAFETY BACKGROUND



TCRP/NCHRP: Improving Pedestrian Safety at Unsignalized Crossings

TABLE D-1. Summary of Treatments for Major Street Crossings at Uncontrolled Locations.

Treatment Type	Picture of Treatment
Roadway Signing Description – Special signs are placed in the roadway within or near the crosswalk • Application – Crossing on higher volume multilane roads • Cost (Including Labor) in U.S. Dollars – $200–$300 per sign • Studies of Effectiveness – Field Evaluation Report (*45*), *Pedestrian Facilities Guidebook* (*46*) • Countries Where Treatment is Used – U.S.A., France, Sweden	 New York, U.S.A.
High-Visibility Markings Description – This method uses ladder- or "zebra"-style crosswalk pavement markings. • Application – Crossings on higher-volume multilane roads • Cost (Including Labor) in U.S. Dollars – $500–$1,000 per crossing • Studies of Effectiveness – See section 6.2 of ITE Informational Report (*44*) • Countries Where Treatment is Used – U.S.A., Europe, Australia, New Zealand	 Puget Sound Area, Washington, U.S.A.
Double-Posted Pedestrian Crossing Signs Description – Standard pedestrian crossing signs are installed on both sides of the approaching roadway at an uncontrolled crosswalk in addition to the near-side pedestrian warning signs posted at and in advance of the crosswalk. • Application – Uncontrolled marked crosswalk • Cost (Including Labor) in U.S. Dollars – $200 per sign • Studies of Effectiveness – None found • Countries Where Treatment is Used – U.S.A., Canada	 Near Downtown Los Angeles, California, U.S.A.

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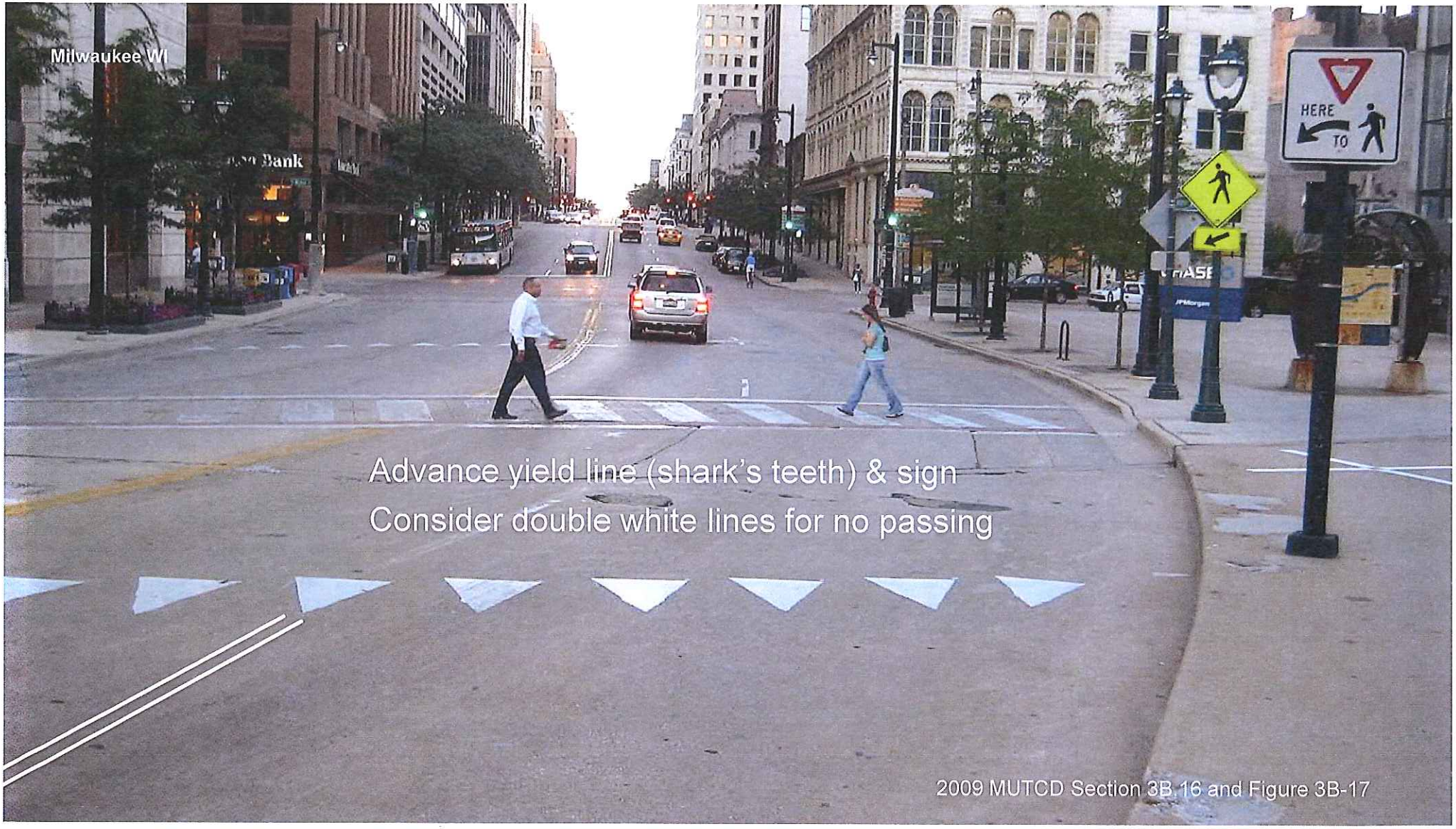
Milwaukee WI
HERE
TO
Advance yield line (shark's teeth) & sign
Consider double white lines for no passing
2009 MUTCD Section 3B.16 and Figure 3B-17

CROSSWALK DESIGN

Rectangular Rapid Flashing Beacons (RRFBs)

- Solar or wired power
- Active detection (push button) - ADA Compliant (APS)
- Passive detection - Bollards, video, microwave
- Two RRFBs per approach
- RRFB in median if there is a median
- Allowable to mount overhead

Two RRFBs per approach

Passive detection bollards

Pedestrian confirmation lights

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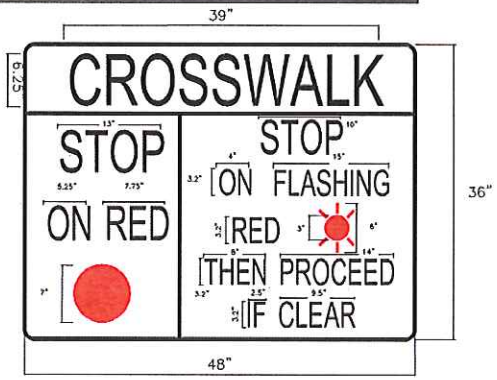
CROSSWALK DESIGN

Pedestrian Hybrid Beacons (previously "HAWKs")

Standard R10-23 sign



Modified R10-23 sign

- Similar in design and cost to pedestrian signal
- Current MUTCD says PHB should not be installed within 100' of intersections
- Shall only be used to control one crossing at an intersection
- Shall have a minimum of two signal heads per approach
- Pedestrian head shall rest with upraised hand*

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CROSSWALK DESIGN

Pedestrian Hybrid Beacons (previously "HAWKs")

1
Blank for drivers

4
Steady red

2
Flashing yellow

5
Wig-Wag

3
Steady yellow

Return to 1

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UNCONTROLLED CROSSING DECISION MAKING & DESIGN

Device Selection Resources

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1
COMMIT
To Multidisciplinary Engagement
2
BUILD
The Vision Zero Database
3
DEVELOP
The "High-Injury Network"
4
ANALYZE
Descriptive Statistics & Identify Collision Profiles
5
MATCH
Countermeasures to Collision Profiles
6
PRIORITIZE
Projects through Scenario Planning
7
IMPLEMENT
Priority Projects
8
EVALUATE
Outcomes
FEHR PEERS
Helping Cities Implement
VISION ZERO

FEHR PEERS

COMMIT

Caltrans

BART

AC TRANSIT

ALAMEDA
County Transportation
Commission

ALAMEDA COUNTY SHERIFF'S OFFICE
GREGORY J. AHERN

ALAMEDA COUNTY FIRE DEPARTMENT
PREVENTION
FIRE
EMS
RESCUE

ALAMEDA COUNTY PUBLIC HEALTH DEPARTMENT

Safe Transportation
Research & Education Center
SafeTREC

ALAMEDA COUNTY
OFFICE OF EDUCATION
L. Karen Monroe, Superintendent

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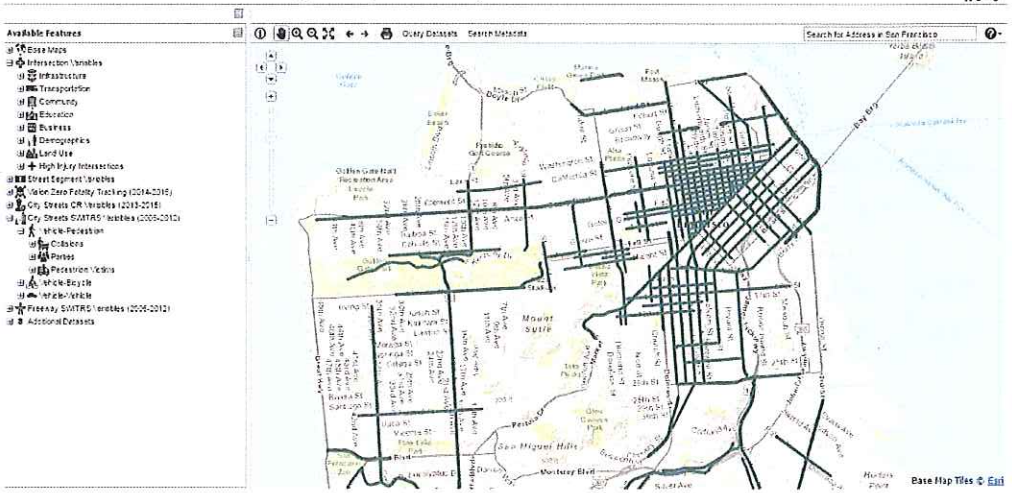
BUILD

Transportation Injury Mapping System

Home About Tools News Help Register Sign In

TransBASE: Linking Transportation Systems to Our Health



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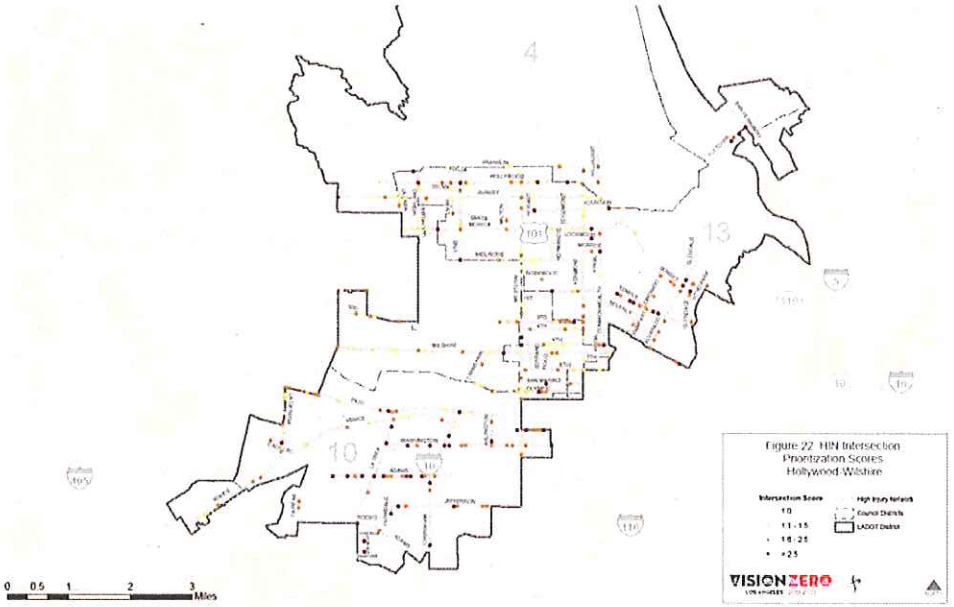
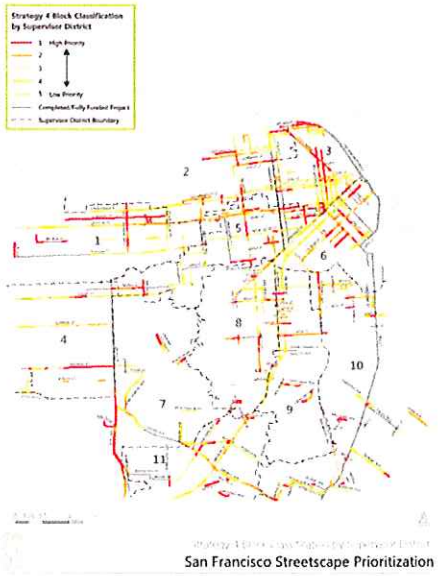
DEVELOP. ANALYZE. MATCH. PRIORITIZE.





San Francisco Streetscape Prioritization

A TECHNICAL GUIDE FOR CONDUCTING BICYCLE SAFETY ASSESSMENTS FOR CALIFORNIA COMMUNITIES

University of California, Berkeley
Institute of Transportation Studies
Technology Transfer Program

A TECHNICAL GUIDE FOR CONDUCTING PEDESTRIAN SAFETY ASSESSMENTS FOR CALIFORNIA COMMUNITIES

University of California, Berkeley
Institute of Transportation Studies
Technology Transfer Program

IMPLEMENT

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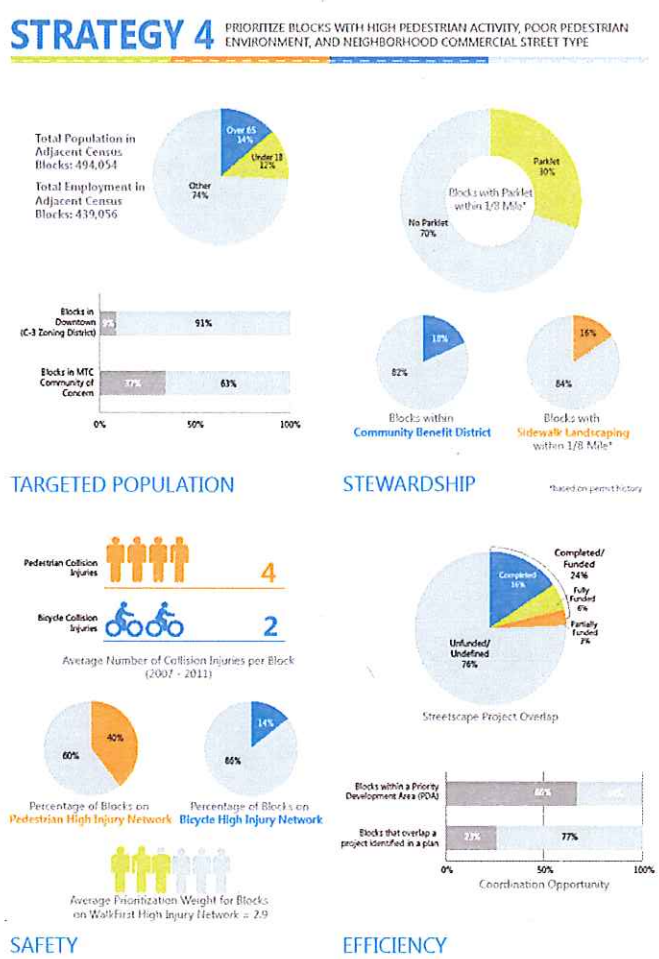
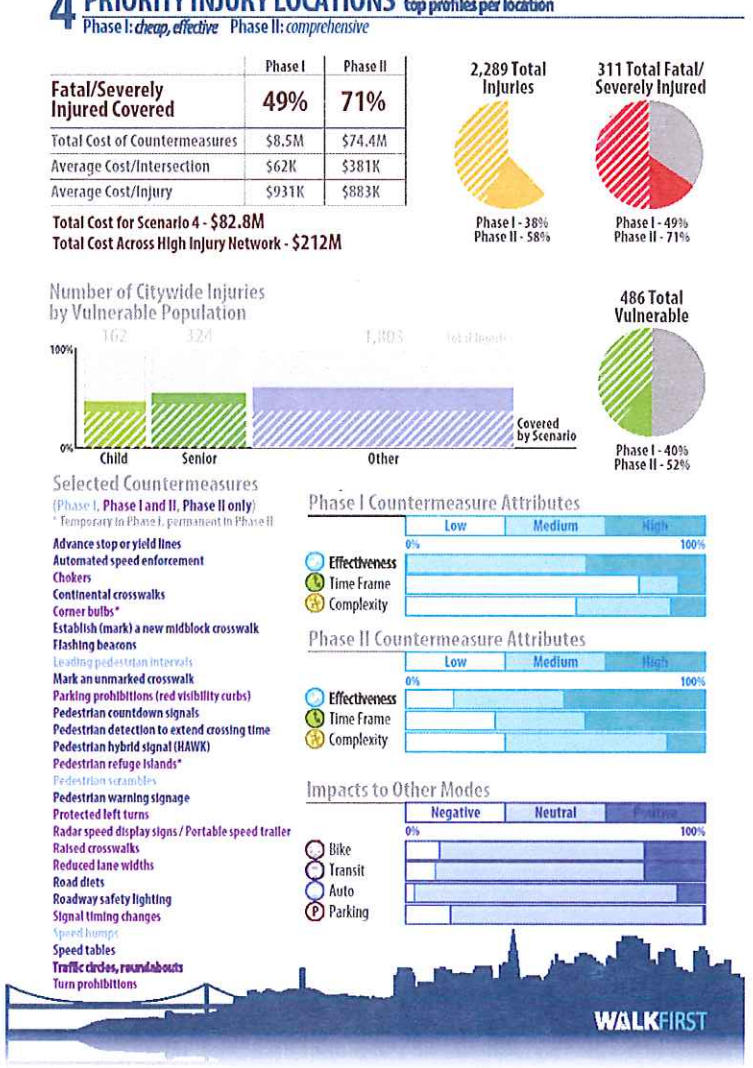


Figure 8
Evaluation Metrics Infographic of Selected Strategy Prioritized Locations



EVALUATE

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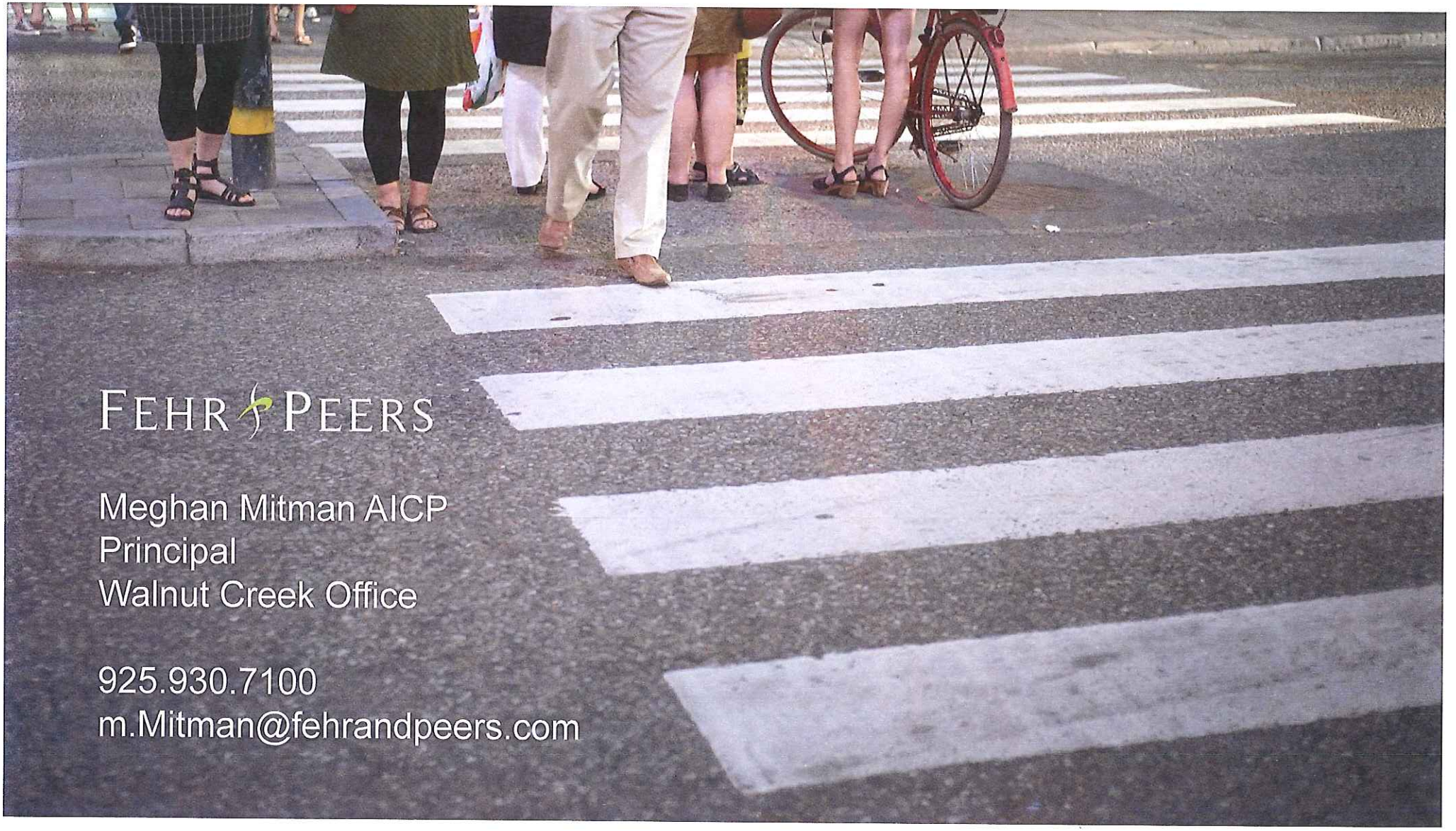
FEHR PEERS
Meghan Mitman AICP
Principal
Walnut Creek Office
925.930.7100
m.Mitman@fehrandpeers.com